Evaluation of the impact of managerial factors on the sustainability of the poverty alleviation egg laying project in the Vhembe District, South Africa

by

Shumani Joseph Tshikosi

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Department of Animal Sciences
Faculty of AgriSciences

Supervisor: Dr H. Lambrechts

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Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date:

Abstract

Information from 200 randomly selected egg project beneficiaries was obtain during 2008 to evaluate the impact of managerial factors on the sustainability of poverty alleviation egg laying projects in the Vhembe district, with special reference to the three municipalities (Mutale, Makhado, and Thulamela). A high proportion (80%) of the beneficiaries was poor rural women. The majority of these beneficiaries are old and illiterate. A high proportion of the beneficiary households is composed of extended families and headed by unemployed women. The majority of beneficiaries are sole breadwinners. The majority relies on agriculture and social grants as a source of income. All the beneficiaries indicated that the project increased the household income as a result of the revenue collected from the sale of eggs. From the study, 96% of the projects were initiated by Government, while only 3.52% were initiated by the beneficiaries themselves. A very high proportion of the beneficiaries (88.94%) was not given any opportunity to decide about the type of the project they were interested in. This also included a high proportion (60.61%) of beneficiaries who indicated they were not interested in starting an egg laying project. A high proportion of beneficiaries (60.71%) were not satisfied with the project, and 51.52% indicated is because of lack of funds and the remainder been because of lack of support from the government. A proportion (53.77%) of beneficiaries indicated that they are visited only once a week by extension officers. A high proportion of the beneficiaries (73.23%) rated the support that they get from the extension officers as poor. A high proportion of the beneficiaries received 36 layers, and only 3.02% were having more than 36 layers. About 69.35% of the beneficiaries didn't know the causes of mortalities of their layers. This also confirmed the high proportion (65.85%) of beneficiaries who indicated that they were not trained to identify and treat diseases. About 73.87% of the beneficiaries rated the performance of the project as good. About 53.27% of the beneficiaries indicated that the project can sustain itself. A proportion of beneficiaries (52.76%) indicated the sustainability indicator as good market of the products.

Opsomming

Inligting van 200 lukraak geselekteerde eierprojek begunstigdes is tydens 2008 ingesamel, met die doel om die invloed van bestuursfaktore op die volhoubaarheid van armoede verligtings eierproduksie projekte in die Vhembe distrik, met spesiale verwysing na die drie munisipaliteite Mutale, Makhado en Thulamela. ‘n Groot proporsie (80%) van die begunstigdes was arm landelike vroue. Die meerderheid van hierdie vroue was oud en ook ongeskool. ‘n Groot proporsie van die begunstigde huishoudings bestaan uit direkte en verlangse familielede, met dié huishoudings wat werklose vrouens as familiehoofde het. Die meerderheid van die begunstigdes is ook die alleen broodwinners. Die meerderheid van die huishoudings maak staat op landbou en welsyn toekennings as ‘n bron van inkomste. Al die begunstigdes ht aangedui dat huishoudelike inkomste toegeneem het as gevolg van die verkoop van eiers geproduseer in die projekte. In die studie was 96% van die projekte deur die Regering geïnisieer, terwyl 3.52% van die projekte deur die begunstigdes self geïnisieer is. ‘n Groot proporsie van die begunstigdes (88.94%) was nie die geleentheid gegun om ‘n keuse te kan uitoefen oor die projek wat hulle wil doen nie. Hierdie laasgenoemde proporsie het ook die begunstigdes (60.61%) ingesluit wat aangedui het dat hulle nie in eierlê projekte belanggestel het nie. ‘n Groot proporsie van die begunstigdes (60.71%) was ontevrede met die projek, met 51.52% van hierdie groep wat dit aan ‘n tekort van fondse toegeskryf het. Die oorblywende 9.19% het dit aan ‘n gebrek van ondersteuning vanaf die Regering se kant toegeskryf. ‘n Proporsie van die begunstigdes (53.77%) het aangedui dat hulle een keer per week deur ‘n voorligtingsbeampte besoek word. ‘n Groot proporsie (73.23%) het die kwaliteit van ondersteuning deur die voorligtingsbeamptes as swak beoordeel. ‘n Groot proporsie van die begunstigdes het 36 lêhenne ontvang, met slegs 3.02% wat meer as 36 lêhenne ontvang het.Ongeveer 69.35% van die begunstigdes was onseker oor die redes vir die afsterwe van hulle lêhenne. Dit ondersteun die groot proporsie (65.85%) van die begunstigdes wat aangedui het dat hulle geen opleiding om siektes te kan identifiseer en te behandel, ontvang het nie. Ongeveer 73.87% van die begunstigdes het die projek as goed gereken, met 53.27% wat gevoel het die projek kan ditself onderhou. ‘n Proporsie (52.76%) van die begunstigdes het die bemarkingswaarde van hulle produk as ‘n volhoubaarheidsindikator beskou.

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AMEN!

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Chapter 1

GENERAL INTRODUCTION

Limpopo Province is one of the poorer provinces in South Africa (SA) and people rely heavily on agriculture for household food security. The country's high rate of unemployment has increased the level of poverty in the province (Table 1). Agriculture and tourism have been identified as potential tools to be used in the fight against poverty and unemployment in the province. The policy on poverty alleviation has in 1999 mandated all government departments in South Africa to participate in the process of fighting food security and poverty.

Table 1. Poverty indicators for Limpopo (Stats SA, 2001).

Indicator	**Limpopo**	**Capricorn District**	**Mopani District**	**Sekhukhune District**	**Vhembe District**	**Waterberg District**
Population (2001)	5 273 630	1 154 690	964 230	745 568	1 199 880	614 158
Annual growth rate (2001)	1.3%	1.66%	2.03%	0.76%	1.79%	2.28%
Labour skill index - % Unskilled & Semi Skilled (2001)	76.6	72	78	79.5	75.9	74.5
Actual Dependency Index (2001)	9.39	7.8	6.7	19	8.7	4.4
Unemployment % (2003)	49.3	50.7	41.8	69.4	53.1	31.2
Human Development Index (2003)	0.49					
Income Distribution – Gini coefficient (2003)	0.60					
% of Population in poverty (2003)	60	65.3	55.5	67.2	62.0	50.8
Poverty Gap in R'bn (2001)	11.5					
Minimum living level household of 5 (2001)	R 1 541					

Various departments, i.e. the Department of Education (DE), Department of Health and Welfare (DHW), and Department of Public Works (DPW) contributed to potential ways to address the food security and unemployment issues. The DE has introduced feeding schemes at schools as one of the means of helping poor families in rural communities to provide food for children. The DHW initiated food parcels as a way of

providing food for the poor rural families in the society, depending on each level of poverty. The extent of poverty depends upon the concept of poverty adopted and the measuring instrument used in each area. The DPW introduced various programs aimed at the poor, the disabled and the unemployed members of the society, programs such Expanded Public Works Program (EPWP).

Many developing countries cannot feed themselves because food production is inadequate to supply the needs of the growing population. Food supply depends on natural resources, which on the one hand need to be used sparingly, while on the other hand generating enough income to sustain the production process. Poverty causes rapid change and puts a huge additional pressure on already overburdened natural resources, resulting in areas suited for extensive stock farming dramatically being changed into dense human settlement due to population increases (LDoA, 2007).

The Department of Agriculture in SA, over the past decade and through communal farming systems, has supported poverty alleviation and food security through food gardens (NDoA, 2003). Discrimination against women on land tenure makes it difficult for the department to alleviate poverty through vegetable production only, since most of the beneficiaries are women (Kitalyi, 1998). For a sustainable vegetable project land size and number of beneficiaries should be in a perfect balance. Egg layers, vegetable gardens and poultry projects have been identified as potential ways to address the question of food security and malnutrition more especially for children in the rural areas and also to fight the escalation of food prices, which renders poorer families helpless. Wealthy people may not regard the increases in food prices as serious, but for those struggling on the breadline, a rise in the price of essential goods may have devastating consequences.

1.1 Background and purpose of the household egg production programme in Limpopo Province

The programme provided poor and needy families with resources in the form of a starter pack to enable them an entry point to egg production for own consumption, income generation and possible future agribusiness engagement (LDoA, 2003). The overall purpose of the programme was to coordinate the distribution of starter packs to selected households. The specific purpose of the programme was to make fresh, affordable eggs available to poor families as a means of ensuring food security and access to increased levels of protein intake.

Fundamentally speaking the programme provided pullets, i.e. ready to lay hens, believed to be sufficient to provide in the needs of the average rural family. A cage unit consists of 36 layers, whereby some eggs will be consumed by the family, whilst others would be sold to buy the feed. Depending on the demand, others could expand the units, making more eggs available for the local market. Hens were bought as pullets or ready to lay (18 weeks old). They start laying at week 20-21 and therefore will produce eggs for a year after which they were sold and a new batch bought by using the profit acquired. The birds were provided in a cage made

of galvanized welded mesh measuring 116cm length x 122cm width x 42cm height, with three compartments per cage and a capacity of six hens per compartment as well as feed enough for at least three months (Figure 1).

Each unit or starter pack provided for each family was composed of the following:

- 36 x hens
  18 weeks ready to lay hens which completed the vaccination programme
- 8 x 50kg bags of laying mash (feed)
  Complete laying mash (4kg is enough per unit per day, NDoA, 1985)
- 6 x nipple drinkers
  Screwed to the caps of used 2L plastic cool drink bottles
  Make a small opening on the bottom of the bottle for air to flow in
- 4 x feeding troughs
  Made of square gutters cut and bent accordingly at each end to the size of the cage in width (122cm)
- 2 x cages (116cm length, 122cm width & 42cm height)
  A cage is made of galvanized welded mesh of three sizes:
  100 x 50 x 1800 x 2.5mm, this is for the front, top and back part of the cage;
  50 x 25 x 1200 x 2.5mm, this is for the base/floor and egg trap tray;
  50 x 50 x 900 x 2.5mm, this is for the sides and partitions.

The NDoA (1985) outlines the advantages of a cage system as follows:

- The hens are kept in a small space;
- The hens are kept in a clean environment;
- The eggs are protected with low percentage of broken ones;
- The eggs stay clean;
- The eggs are collected easily;
- The hens get fewer diseases;
- Less chance of hens being stolen;
- They need very little care;
- It is very easy to keep the cage clean as the manure falls through the mesh floor;
- You can easily see when the drinking water is finished;
- Feed is not wasted;
- It makes good record keeping possible;
- You can make the cage yourself;
- Elevate the cage from the ground to ensure that the manure falls through and
- The cage should slope slightly for easy collection of eggs from the trap tray.

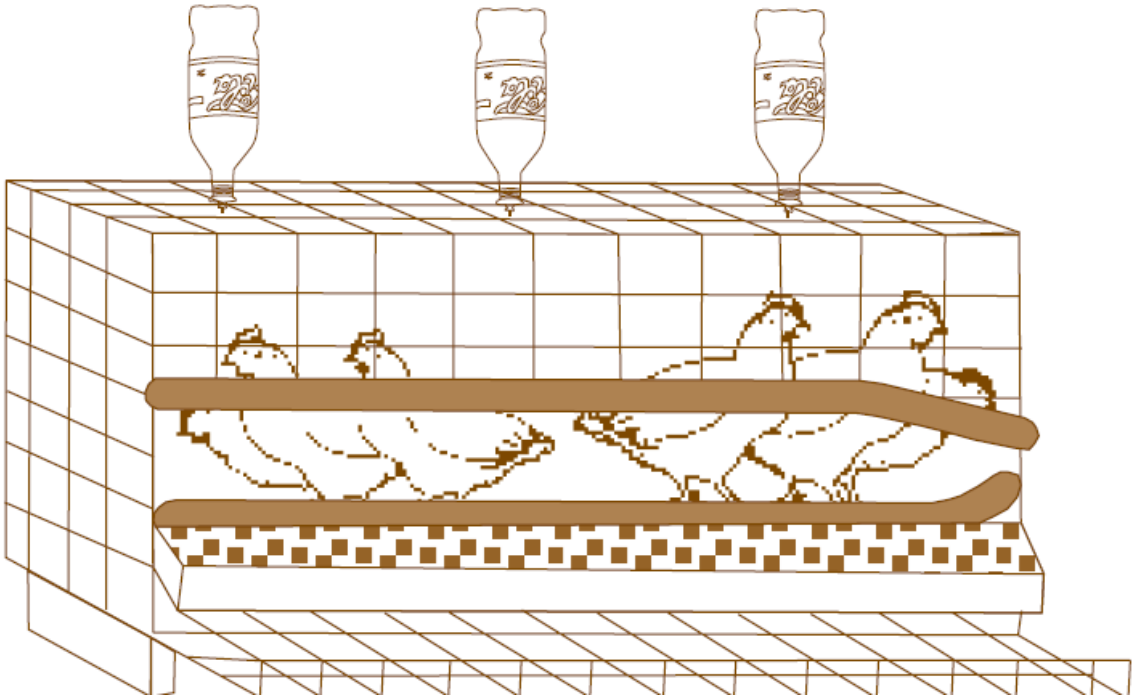

Figure 1. Schematic presentation of a household egg production unit (NDoA, 1985).

A total of 911 households benefited in the Vhembe districts. The criteria used for the selection of beneficiaries were the poorest of the poor households, i.e. having no other source of income. In cases where there was a working member in the family, the total family income was not allowed to exceed R 573.26. This income is equal to the minimum wage, as stated by the Basic Conditions Of Employment Act, No 75 of 1997 (Department of Labour, 1997). The majority of these households received food parcels as part of the National Food Emergency Program (NFEP).

The focus was also on female-headed households, with preference given to the households that were in the database of the DHW. It was believed that women are responsible for the care of children and they would try by all means to make hands meet to put bread on the table. Experience shows that an entire family benefits more from income generated by the woman than that generated by a man in the household (Sen, 1999). Empowering resource poor women thus play an important role in contributing to food security.

The reasoning for the potential success of the programme was that during the implementation phase, the layers should produce enough eggs to pay for future feed purchases by the household, thus making the unit self-sustaining. It was assumed that an average family will consume an average of 6 eggs per day and that the remaining eggs will be sold to cover feed and miscellaneous costs. The beneficiaries were thus responsible for subsequent feed purchases and other costs related to the sustainability of their units. A daily income of the value of one egg can have a substantial influence on a very poor family's livelihood, while the impact on a better off family will be minimal.

1.2 Outlay of thesis

Chapter 1 provides a general introduction to the study, with particular reference to the background and purpose of the household egg production programme, as well as the implementation thereof in the Limpopo Province of South Africa. Chapter 2 gives a literature review to justify the purpose of the study. Chapter 3 describes the methodologies used to evaluate the impact of the egg production programme in the respective districts in which households were surveyed. To conclude, Chapter 4 summarise the research findings, and suggest possible strategies to address the shortcomings that were identified.

Chapter 2

LITERATURE REVIEW

2.1. Introduction

Terms such as poverty eradication and poverty alleviation are often used interchangeably. It is therefore important to distinguish what these terms define. While absolute poverty can be eradicated, relative poverty can only be alleviated, because what is minimally accepted today may vary over time, from villages to urban areas, and also between countries. Relative poverty also varies with levels of economic development, and the perceptions and expectations of the majority on what is minimally acceptable. For example, while clean piped water may be a minimum acceptable standard of living in a city, it may not be a minimum requirement in a village. Similarly, while possessing a telephone may be a minimum necessity in a country like the United States, it may not be a minimum requirement in a country like India.

Governments have agreed to halve the number of poor and hungry people in the World by 2015, as expressed in the 'Millennium Goals' (UN, 2001). The search in all economic sectors is now on for ideas and experiences that can be translated, and policies aimed at alleviation and eradication of poverty. Poverty remains a significant challenge and it is a challenge that continues to grow due to an increase in internationally, the number of poor people. Rural poverty has proven to be particularly intractable (ADB, 2005a). With the conceptual framework of sustainable livelihoods approach (DFFD, 1999), key constraints hampering poverty reduction can be identified and assigned to the lack of capital assets such as human, natural, physical, social and financial capital; farmers' vulnerability and aversion to risks.

Focusing on poverty alleviation, appropriate development concepts have to be elaborated and adjusted to the local conditions to meet the particular requirements of the households/farmers. In countries such as Bangladesh, the concept of smaller poultry units has been developed in a unique learning process over a period of more than two decades. The use of small units of 5-10 adult birds has in recent years for instance caught the attention of developing countries. These projects were initiated with support from the World Food Programme to assist poor women and their families with the relief of poverty, and it was demonstrated that poultry production in very small units could alleviate poverty. The smallholder poultry concept is in the process of being institutionalised through commodity networks. The first network that was created was the International Network for Family Poultry Development supported by the FAO (Sonaiya, 2000). This specific network is committed to, among other things, supporting the promotion and development of poultry projects.

2.2. Egg production as a tool for poverty alleviation

Globally, agriculture provides a livelihood for more people than any other industry (Ahuja & Sen, 2007). Growth in agricultural production and productivity is needed to raise rural income, to support the increasing

numbers dependent on the industry, and to meet the food and raw material needs of the faster growing urban populations. Agriculture therefore plays a key role in reducing poverty, since most of the world's poor live in rural areas and are largely dependent on agriculture, while food prices determine the cost of living for the urban poor. About half of the total poor live in South Asia, and half the reminder in sub-Saharan Africa, with small numbers in the rest of the developing world (Ahuja & Sen, 2007).

In South Africa the livestock sector, which include industries such as cattle, sheep, goats, game, poultry and aquaculture, poultry production plays an important role in socio-economic development. It is a sub-sector of agriculture and contributes significantly to rural livelihoods sustainability and food security. The sub-sector plays a key role in agro-processing industry. Employment creation, foreign exchange earnings and general poverty reduction are some of the envisaged spin-offs of accelerated livestock production. Among livestock-based sections, poultry occupies a pivotal position because of its enormous potential to bring about rapid economic growth, particularly benefiting the weaker sections. In recent years there has been a growing recognition among the development community of the role of small-scale commercial poultry production in accelerating the pace of poverty reduction and reaching out to the poorest of the poor (Ahuja & Sen, 2007). However, without underscoring the capacity and potential of other livestock sub-sectors, the scope of this work will only be limited to poultry and more precisely, egg laying projects.

Poultry farming serves as an additional occupation to supplement the income of most families. Poultry production has the potential to specifically generate rapid household income and adequate protein supply (FAO, 1997). The production cost per unit is low compared to other types of livestock projects, for a production cycle is short, and hence capital is not tied down over a long period. Poultry production in SA has been practiced by rural communities for many generations. In SA intensive poultry production is practiced and it is confined to the peripheries of the metropolitan areas of Gauteng, Durban, Pietermaritzburg, Cape Town and Port Elizabeth (NEPAP-CAADP, 2007). South Africa's annual poultry meat production is 960 000 tons (SAPA, 2006). Broiler production contributes about 82% to total poultry production, with the rest consisting of mature chickens slaughter (culls), small-scale and backyard poultry production, ducks, geese, turkeys and other specialized white meat products. Income from poultry and egg production amounted to R11.3 billion in 2002.

For the majority of rural households headed by widows, and children or grandparents, poultry represent the easiest species to raise for sale and home consumption, providing a high quality protein and micronutrients, which play an important role in nutrition. Eggs in particular offer a great nutritional bargain for they contain approximately 315 kilojoules, and are one of the best quality protein sources known. Eggs also supply an array of vitamins such as Vitamin A and Vitamin B_{12}, and they are one of the best food sources of vitamin K, a bone boosting nutrient (NRC, 1994). Eggs also provide choline, a B vitamin that plays a role in development (Vohra *et al.*, 1997). In addition, eggs can be stored for several days under rural conditions and require very little energy or time to look.

Nutritionally, eggs have been recognized as an important source of protein in the diet of man, and even for livestock. It is considered as a protective food because it contains nutrients which protect and complement body losses in a diseased state. Egg contains 74% water, it is a good source of high protein, and is often used by nutritionists as a standard reference for evaluating other protein intake for adults (Awoniyi, 2003). Chicken egg protein has a biological value of 1 and so shares with human protein the distinction of being a perfect protein source (Orji *et al*., 1981). The fat of egg is readily digestible and is made up of both saturated and unsaturated fatty acids. Eggs are also used in various food industries, confectionery and for producing cosmetics and vaccines (Awoniyi, 2003).

According to Gueye (1998), a daily income of the value of one egg can have a substantial influence on the livelihood of a very poor family, while the impact on that of a better off family will be minimal.

2.3 Egg production in various countries around the world

Poultry is by far the largest livestock group and is estimated to be about 14 000 million, consisting mainly of chickens, ducks and turkeys (FAO, 1999). In total, poultry products (egg and meat) constitute 30% of all animal protein consumed worldwide, and the share is increasing (Permin *et al*., 2000). Within the last 10 years, this proportion has increased from 20% to 30% of all animal protein and is predicted to increase to 40% before the year 2015 (IFPRI, 2000). The keeping of laying hens developed rapidly around the world today. The number of layer hens in the world is estimated at 5690 million in 2006, producing just over 66 million metric tons of eggs. Asia, the largest egg producing region, produced 42.4 million tons in 2006 with China, the worlds largest egg producer, producing just less than 30 million tons; 44.9% of the global egg production. Europe produced around 10.1 million tons, while North America produced just over 8.2 million tons (FAO, 2006). Australia is ranked 41st in terms of egg production with approximately 13 million layers producing 164 000 tons of eggs.

African livestock population statistics for 1995 indicated that poultry was the most numerous species of farm animals. More than 80% of poultry were kept in rural areas and contribute substantially to annual egg and meat production (Sonaiya, 1997). Throughout Africa, poultry production stems from ancient traditional practices. Within the Southern African Development Community (SADEC), SA is on top of the list at producer level as shown in Table 2.

Table 2. Egg production in the South African Development Community (SAPA, 2005).

	Product quantity (ton)	**Share in SADC (%)**
South Africa	339 000	66.0
Zambia	46 400	9
United Republic of Tanzania	35 100	6.8
Zimbabwe	22 000	4.3
Malawi	19 500	3.8
Madagascar	14 900	2.9
Mozambique	14 000	2.7
Democratic Republic of the Congo	6 000	1.2
Mauritius	5 200	1.0
Angola	4 300	0.8
Botswana	3 150	0.6
Namibia	1 900	0.4
Lesotho	1 512	0.3
Swaziland	1 050	0.2

In South Africa, the poultry industry continues to dominate the agricultural sector. The turnover at producer level for 2006 was R3.8 billion for eggs, and the industry was able to supply 350 000 tonnes of eggs (SAPA, 2006). With this turnover of R3.8 billion at producer level, eggs are the fourth largest animal product sector in agriculture in South Africa. The geographical distribution of egg production amongst the provinces in SA is as follows: Gauteng 28.6%; Western Cape 18.8%; KwaZulu Natal 14.1%; North West 8.9%; Mpumalanga 8.8%; Free State 8.2%; Eastern Cape 6.7%; Limpopo 5.7%, and Northern Cape 0.3% (SAPA, 2006).

2.4. The role of women in poverty alleviation in the world

Women constitute more than 50% of the world population (Ahuja, 2005). Despite their considerable involvement and contribution, women's role has often been underestimated or ignored. Gender blindness is partly the result of a paternalistic bias, but also of the attitudes of women themselves, who may have been conditioned by their culture and society to undervalue the worth of the work they do. In many communities, particularly poor women's survival and that of their households, depends on access to and control of natural resources. It is often stated that women are responsible for more than half the world's food production overall, producing up to 60 to 80% of basic foodstuff in Africa (Fresco, 1998).

The role women play in agriculture and the rural society is fundamental to agricultural and rural development in sub-Saharan Africa. The Technical Centre for Agriculture and Rural Cooperation (CTA, 1993), reported that women in Africa make up more than one third of the workforce. According to the estimates, 84% of the economically active women are involved in contribution towards agriculture in India, which accounts for 87% of the India's GNP (NSS, GOI-1991). Thus women play a pivotal role in agriculture development and their

involvement is indispensible for the effective implementation and equitable distribution of the benefits of agricultural poverty alleviation programmes.

Women play a leading role in poverty alleviation through community initiatives and their activities in agriculture, especially in countries where men are migrant laborers. In the study conducted by Ekunwe *et al.* (2006), it was revealed that 32% and 68% of the farmers are male and female, respectively. In the same study it was also revealed that females are more involved in the management of small-scale deep litter systems than their male counterparts. In some cases they are heads of households, yet in many countries they are discriminated against by being denied access to land resources. However, when combined with other factors, female household headship does give some indication of the state of poverty, making it evident that, where they are poor, female heads of households are among the poorest of the poor. According to an IICA/IFAD study in 1994, the female headed families with young children, and those with other family members as well as extended families, endured the greatest degree of critical and moderate poverty in each category (Jensen & Dolberg, 2003).

Improving the nutritional status of children is closely linked to the empowerment of women (Sen, 1999). The responsibility for getting food for the families lies with women (Onwubike, 1990). The activities of women also goes beyond food production to other agricultural aspects like livestock and poultry production and other income generating activities within their locality so as to enable them to take care of their families. Experience show that the entire family benefits more from income generated by a woman than an income generated by a man (Sen, 1999).

2.5. Challenges faced by poultry project beneficiaries

2.5.1 Technical challenges

The key challenge for development and poverty alleviation is the identification and promotion of broad-based income opportunities that may lead to the significant alleviation of poverty. The poultry industry appears to present a major opportunity to enhance the livelihoods of a large portion of the world's poor.

Experience from around the world has shown that with relatively simple technical measures, smallholders' production of meat and eggs from local or improved poultry breeds can be improved (Gueye, 2003; Riise *et al.,* 2005). However, adoption of new technologies is a slow process for most small-scale farmers (Larsen, 2002). Locally appropriate approaches for technology transfer need to be developed and tested together with and by the farmers themselves (Dilts*,* 1995*).* Unfortunately, even today, the majority of small-scale producers around the world still depend on local extension systems when they want to develop or expand their livestock keeping. These extension systems are, in most places, either completely lacking or highly dysfunctional due to budgetary limitations, and severe reductions in man-power caused by a general reconstruction of the involved advisory systems (Hooton *et al.,* 2003). This calls for a participatory approach, whereby farmers may

themselves develop an enabling environment for them to demand the necessary inputs, in particular in terms of veterinary services and training. Such a demand driven process will often have a slow start, as it requires training of farmers more than techniques.

Successful rural economic progress through poultry development rests on building additional human and organizational capacity. Training relating to group formation, organizational skills, saving and credit often becomes more important in the initial phase. To have the desired impact these capacities should be developed broadly at all levels; including smallholder farmers and training and extension officers as well as among researcher and policy makers. Generally communal and black emerging farmers have potential that needs to be unleashed for them to make a significant contribution towards poverty alleviation and economic development (Fraser, 2006).

2.5.2 Financial challenges

Financial barriers prevent emerging farmers from starting or intensifying their production activities. The investment required often exceeds their capital wealth. Reducing the risks and mitigating their effect on poor livestock dependent people are prerequisites for a sustainable reduction in poverty. Small-scale production is associated with both market and production risks. Market risks include price fluctuations of both inputs and products are often associated with a weak negotiation position.

Development interventions in the livestock sector have not been successful (Steinfeld, 2004). Many livestock development projects have not succeeded because of inappropriate technologies and failure to deliver services to poor farmers. However, even in the cases where the technologies were appropriately targeted and the focus was distinctly pro-poor, many technical projects have failed to improve the livelihoods of the poor substantially.

2.5.3 Low egg production and economic returns

The laying cycle of a layer usually covers a span of about 12 months. Egg production begins when the birds reach about 18-22 weeks of age, depending on the breed and season (Jacob *et al.*, 2003). Flock production rises sharply and reaches a peak of about 90%, 6-8 weeks later. Production will then gradually declines to about 65% after 12 months of lay. The level of production is very low compared to high input systems, with scavenging hens laying 30 eggs per year; while industrialized battery hens lay up to 300 eggs annually.

According to the NDA (2004), it is possible to provide eggs for the family by keeping 9 to 12 hens. Each hen will lay up to 6 eggs per week, and if you have 9 hens they will lay 8 to 9 eggs per day. One can therefore sell 4 eggs per day to pay for feed of the hens and the remaining eggs can be used for home consumption. If there is a demand of eggs in the area, the project can be extended. This is possible if the production of more than 80% is reached.

There are many factors that can adversely affect egg production and make the small egg production not sustainable. In some instances the project can be affected by a sudden drop in egg production. Unravelling the cause of a sudden drop in egg production requires a thorough investigation into the history of the flock. This will further affect the return of the project. Lower production results in lower income and therefore the unsustainability of the project.

The probable reasons for lower production could be poor management, i.e. poor know how and a lack of health and extension services to the beneficiaries. Factors responsible for low productivity levels may include *inter alia* poor managerial skills, irregular supply of feeds, and poor quality of feed; water intake; intensity and duration of light; parasite infestation; disease and numerous managerial and environmental factors (Jacob *et al.*, 2003; Badubi & Ravindran, 2004).

2.6 Managerial factors affecting egg production

Effective and efficient management techniques are necessary to increase the productivity of a system and consequently increase income. In the case of poultry farming, this entails not only proper housing and feeding, but also a careful rearing and good treatment of the birds. Oluyeni & Robert (1979) reported that egg production is the major index of performance of any commercial layer business, because it accounts for about 90% of the income from the enterprise. The economically important traits which can be used to determine the performance of the layer-type chicken include egg qualities (particularly egg size); efficiency of feed utilization and mortality (Oluyeni & Robert, 1979). The maximum that a hen is capable of producing in the first laying year is about 300 eggs (Oluyeni & Robert, 1979). In the tropics, production has on average remained at 180-200 eggs although higher levels have been reported (Oluyeni & Robert, 1979).

The nutritional quality of eggs and the quality of the egg shells are influenced by many factors such as strain; age; nutrition; disease; management practices; water quality; housing conditions; temperature; and stress. Sometimes a number of these factors will interact to cause a problem. Because of these interactions, the causes of egg and egg shell quality problems are often difficult to diagnose. Problems with quality of eggs and egg products have the potential to cause health risks and undermine the confidence of consumers in the quality and safety of the product.

The housing and management of layer hens can be carried out using one of two methods, caged layer production or floor production (Yakubu *et al.*, 2007). Use of either method can keep the hens in production throughout the year, if proper environmental and nutritional needs are met. Regardless of which production method is used, 22 week old pullets should be given an increasing daily light schedule after they been placed in the laying house (Ralph, 1998).

2.6.1 Housing

The performance of laying hens kept in the tropics is determined to a large extent by the birds' productive adaptability. A high level of performance, no doubt, is the aim of any enterprise involved in the production of eggs. The principal requirements for housing are to protect the flock from inclement weather conditions including rain, wind, and temperature extremes. Additionally, housing allows closer supervision of flocks, protection from natural predators, and concentration of poultry populations to allow improved feeding, health promotion and management programs. As a result chronic health problems are minimized, mortality rates decreased, productivity is increased and flock profitability is greater. The flock benefits from an optimum environment, the producer benefits from improved returns, and the consumer benefits from improved egg quality and lower prices.

Numerous field tests have shown that five layers in a cage will result in lower production and lower feed efficiency. Campbell and Lasley (1975) reported that the level of production of laying hen depends not only on the inherited capacity but also to a great extent upon her environment. The environmental conditions affecting the productivity of a hen include temperature, relative humidity, light, sunshine prevailing at a given time; housing system and ventilation (Hazan, 1984; Kassim *et al*., 1984)

2.6.2 Ventilation

An environmentally controlled house is one in which the temperature, air quality, air flow rate, and even light intensity can be modified by the operator to meet a desired standard (Donald, 1999). The goal is to provide, as far as is economically possible, the optimum requirements for each bird's health, freedom from stress, and the most efficient utilization of feed for good egg production. Ventilation is the key element in environmental control, and in most cases temperature is the most critical environmental factor to be controlled. The design and management of the ventilation system are vital to achieving optimum egg production at the lowest possible cost (Janni & Jawbson, 2003)

2.6.3 Temperature

Temperature differentials have considerable economic implications because temperature influences egg size and, most importantly, feed intake. High environmental temperatures pose severe problems for all types of poultry. High temperature and humidity have some negative effects on thermoregulation; a decrease on feed consumption (Cowan & Michie; 1978; Howldier & Rose, 1987) and feed efficiency. A high temperature also results in a reduction in poultry live weight (Mowbray & Sykes, 1971), growth rate and high mortality (Arjona *et al*., 1988), in addition to a decrease on productivity and quality of the eggs (Ozbey & Ozcelik, 2004). Feed consumption, egg production, egg size, and hatchability are all adversely affected under conditions of severe heat stress. Environmental temperature also plays an important role in determining how much feed (energy) the bird will consume. Larger pullets at sexual maturity have larger appetites and physical capacity to

consume feed (Miles *et al*., 2000). Smaller birds with their associated reduced appetites, will usually undergo more stress in the multi-bird cages used in today's laying houses. More stress is reflected in fewer eggs and even smaller body weights (Miles *et al*., 2000).

It has been shown for many years that house temperature is one of the most important facts affecting feed consumption. There is a change in feed consumption as house temperature increase or decrease, but the relationship is not constant at various house temperatures. Stockland and Blaylock (1974) in their study on rearing pullets at 29.4˚C and 18.3˚C concluded that protein requirement as percentage of diet was increased in a hot environment. McNaughton and Deaton (1981), on the other hand reported that neither dietary protein nor energy influenced body weight at 20 weeks of age under higher temperature conditions. Reid (1979) indicated that metabolizable energy (ME) intake declined 2.3% per degree centigrade as environmental temperature increased from 20˚C to 30˚C. Above 30˚C both feed intake and egg production were markedly reduced. Glatz (2001) reported that laying hens at 30˚C consumed more feed and produced eggs with an improved egg shell quality when temperature of their drinking water was reduced to 15˚C in one case, and 5˚C in another.

The study by Balnave and Muheereza (1998) showed that when laying hens were exposed to 32˚C from 20 to 62 weeks of age and fed a diet containing 120MJ of ME/kg; 199g crude protein; 9.2g lysine, 4.8g methione and 7.9g TSAA/kg, the application of a repetitive intermittent lighting programme of 3h light:1h dark (3L:1D) rather than daily 16L:8D, schedule significantly increased feed intake, body weight gain, egg weight and egg shell quality.

Petersen *et al*. (1988), in a study on the effect of heat stress on performance of hens with different body weights, reported that a permanent laying stop is observed in heavy birds and in hens with a low feed intake during the first months of laying. Heat stress significantly increases water consumption, reduces egg production, egg weight, shell thickness causing a significantly higher production of shellers or very thin shelled eggs. The optimal laying temperature according to Kekeocha (1985) is between 11˚C and 26˚C (Table 3).

Table 3. Temperature and its effects on egg production (adapted from Kekeocha, 1985).

Temperature (°C)	**Effects**
11-26	Good production
26-28	Some reduction in feed intake
28-32	Feed consumption reduced and water intake increased; eggs of reduced size and thin shells
32-35	Slight panting
35-40	Heat prostration sets in, measures to cool the house must be taken
40+	Mortality due to heat stress

There is a general agreement among researchers that high ambient temperature have a negative effect on egg quality. Many researchers have reported a reduction in egg weight associated with increase in environmental temperature (Payne, 1966; Stockland & Blaylock, 1974; DeAndrade *et al*.,1977; Vohra *et al*., 1979). Shell quality has also been shown to be reduced as environmental temperatures rise.

2.6.4 Lighting

Light is an important aspect of an animal environment. Avian species as well as mammalian species respond to light in a variety of ways, including growth and reproductive performance. One of the basic roles of light intensity has been that the layer house should never be darker than the pullet house. Pullet houses have also traditionally quite dim for ease of management.

Early light intensity studies performed almost without exception in the floor pens and were limited to production effects. It was shown in layers that there was a proportional effect of intensity on rate of laying at levels below 5lx (0.5 fc). This should be done to a delayed sexual maturity or to less frequent eggs. Maximal rates of lay occurred at intensities of 5lx and above. More recent studies have shown no differences in egg production with intensities down to 1,75lx (Renema *et al.*, 2001).

Hens need about 14 hours of day-length to maintain egg production. The decreasing daylength during the fall and shorter daylength in the winter would be expected to cause a severe decline or even cessation in egg production unless supplement light is provided. When production ceases, the birds may also undergo a feather molt. Hens exposed to only natural light would be expected to resume egg production in the spring (Jacob *et al*., 1998).

2.6.5 Nutrition

The main goal of nutrition is to produce a flock of birds which, when placed in the layer house will attain optimum performance. Advances in genetic selection make today's pullets quite different from those of only a few years ago. Laying chickens require a completely balanced diet to sustain maximum egg production overtime. Inadequate nutrition can cause hens to stop laying. It is important to supply laying hens with a constant supply of nutritionally balanced layer food as inadequate levels of energy, protein or calcium can cause a drop in egg production. Feeding whole grains, scratch feeds and table scraps will cause the birds to become imbalanced and inadequate. Often these imbalances can cause other problems like oviductal prolapse. Prolapse may occur when the bird is too fat and/or an egg is too large and the bird's reproductive traits expelled with the egg. The omission of feed ingredients also lead to other complications and drop in egg production e.g. the omission of salt, lead to increased feather picking and a decline in egg production; shortage of calcium lead to poor egg shell quality as the egg shell is composed primarily of calcium carbonate (Jacob *et al*., 1998).

The quality of feeds given to animal is also very important in the overall performance of the birds. All birds should have access to an adequate supply of a completely balanced ration which meets all the nutritional requirements. Any imbalance will results in toxicoses. For instance, the nutritional role of phosphorus and calcium is closely related, both are constituents of bones. The ratio of dietary calcium to phosphorus affects the absorption of both these elements; an excess of either one impedes absorption and can reduce egg production, shell quality and/or hatchability (Jacob *et al*., 1998). Excess vitamin D_3 leads to increased calcium absorption, resulting in hypocalcaemia and a resulting drop in egg production.

Feed stored in the farm longer than weeks may likely become mouldy. Moulds can produce mycotoxins which adversely affect egg production and general health (Jacob *et al*., 1998). If hens are out of feed for several hours, a decline in egg production probably occurs. The extent of decline will be related to the time without feed.

Once egg production begins, energy intake is the critical factor controlling egg numbers. Therefore, the diet must contain an adequate concentration of calories if small birds are going to be expected to perform to their full potential at peak and as the laying cycle continues. If greater egg profits are to be realized during the entire laying cycle, it is essential that replacement pullets attain proper body weight. A bird that remains small will lay small eggs at the onset of egg laying. Once egg production begins it is too late to correct body weight problems in a flock. The smaller birds will remain small and the larger birds remain large throughout the laying cycle. Since feed intake is correlated with body weight increases, the decreased egg size are often seen in some young flocks is most likely a result of feed intake.

2.6.5 Health

The best fed, housed and genetically ideal chicken will not grow or lay eggs up to its potential if sick or infested with parasites. Since massive numbers of laying hens are concentrated in a confined area in modern production systems, potential losses from a severe disease outbreak are great (Vanhooser, 1990).

Prolapse, fatty liver hemorrhagic syndrome; yolk peritonitis and cage layer fatigue remain the most common causes of mortality (Faroog, 2001). Other common viral diseases such as egg drop syndrome (EDS), avian influenza (AI); Newcastle disease (ND) and infectious bronchitis (IB) may have a pronounced effect on egg shell and internal quality. If one disease had to be singled out as being the one responsible for the majority of the economically significant production losses in egg layers, it would be IB (Butcher & Miles, 2003).

2.6.6 Biosecurity

Disease control and prevention is essential in order to maintain a healthy productive flock. Control of certain disease depends on application of efficient bio-security, enhancing the immune system and more effective vaccination. Proper security measures can greatly reduce the chance of disease outbreaks. Use of

disinfectant footbaths or wearing plastic foot covering when entering buildings also play a role in preventing disease transmission between systems or farms.

2.6.7 Record keeping

Successful intensive poultry keeping requires good records keeping of all flock activities, including hatch dates, body weight (to ensure that pullets will have reached optimal body weight when they are brought into egg production); lighting programme; house temperature, disease history, medication and vaccination dates; quantity and type of feed given (important in calculating efficiency of feed utilization) and mortality. In low input production producers keep simple records like, total number of birds kept, eggs collected, eggs sold, income received, and mortalities only. The extension officers will use the records to advice the beneficiaries. Those who cannot read and write it becomes a problem and they will have no records kept. This then makes it very difficult to assess the success of the project.

Records will help pinpoint when there is a change in the flock that may be due to introduction of a disease agent. There may be an increase in mortality, a decrease in feed consumption, or a drop in egg production. Such records not only help the producer determine when a change occurred in the flock, but they help a veterinarian determine the probable cause of such changes.

2.7 Approach for the implementation of poverty alleviation projects by the Limpopo Department of Agriculture

Empowering resource poor households contribute importantly to food security. Several years ago, Robert Chambers in his book *Rural Development: Putting the Last First* referred to the development professionals pre-occupation with cattle (Chambers, 1983). In a recent review of more than 800 livestock projects, Ashely *et al.* (1999) noted that, indeed, most livestock projects had been cattle projects and they concluded that paucity of evidence that demonstrated any long-term sustainable impact on the poor is disappointing and that donors may need to rethink their approach to the sector, and develop a new paradigm for poverty reduction through livestock (Ashley *et al*., 1999).

Limpopo Department of Agriculture in its draft Poverty Alleviation Strategy outlined the following approach to be used for the selection of beneficiaries and implementation of poverty alleviation projects: using both the economic principles and instruments to select beneficiaries and provide them with support to develop themselves within the sustainable Livelihoods approach framework. Economic and environmental sustainability criteria will determine the project beneficiaries to support. It is accepted that social instruments such as social grants will be used by the relevant social departments to support those who cannot fit the economic criteria for selection. The implementation to be done by line function departmental units in partnership with civil society organizations, donors, private institutions and other sector departments.

Chapter 3

EVALUATION OF THE IMPACT OF MANAGERIAL FACTORS ON THE SUSTAINABILITY OF POVERTY ALLEVIATION EGG LAYING PROJECTS IN THE VHEMBE DISTRICT OF LIMPOPO PROVINCE OF SOUTH AFRICA

3.1 Introduction

Poultry production plays a significant role in the socio-economic development of the World. Almost 90% of all rural families keep a small number of indigenous chickens under traditional free range semi-scavenging systems. The main feature of this production system is the low input/output requirements, sometimes generating quick returns on investment. Poultry is one of the few assets that poor households have or can acquire.

Considered as a secondary business, poultry are generally maintained by rural women and children to generate cash revenue, but also to supplying adequate eggs and meat to their personal family's diet. A study report on the impact of the Smallholder Livestock Development Project (SLDP) in the rural areas of Bangladesh revealed that the overall socio-economic conditions of the beneficiaries, their eggs and meat consumption capability, empowerment of rural women in decision-making issues and employment opportunities were significantly increased after intervention made by SLDP (Alam, 1997). In another study conducted by Dolberg (2001), it was also noted that income from the sale of eggs, apart from being used to improve the diet by adding variety and quality, it was used to educate children and, where this was possible, to begin a process of asset accumulation. It can be seen that the contribution is not so much from the increased domestic consumption of poultry meat and eggs by the producers as it is from the income, which the poultry products generate.

3.2 Aim of the study

The main aim of the study is to evaluate of the impact of managerial factors on the sustainability of the poverty alleviation egg laying projects in the Vhembe District in the Limpopo Province of SA. The study will evaluate the approaches and methods used to implement the programs in the respective provinces, as well as the coordination of projects with the involvement of beneficiaries and other stakeholders in the community. To conclude the study will aim to formulate recommendations, based on the findings from the evaluation and data made available for the LDoA.

3.3 Materials and methods

3.3.1 Location of survey

The Vhembe district, one of four districts in the Limpopo Province, was chosen as the district to conduct the survey. The Vhembe district is situated in the northern part of the Limpopo Province, sharing borders with Zimbabwe in the north, Mozambique through the Kruger National Park in the east, and Botswana in the north-west. The district is about 200km from Polokwane, which is the capital city of Limpopo Province. The district is composed of four municipality, i.e. Musina; Makhado; Mutale and Thulamela. (See Appendix 1 for a map of the Vhembe District).

The climatic conditions are semi-humid with a long plant-growing season. The soil type is clay loam and good for vegetable cultivation and horticultural practices. The district has a low annual rainfall of 400 to 600mm per annum (Oni *et al.*, 2003). The temperature of the area is hot in summer and cool in winter and good for broiler production with good management.

Poverty alleviation and food security projects targeted are those initiated by other departments, with the objective of alleviating poverty and food security in the rural communities. The LDA initiated a series of poultry projects with broilers and layers in the four municipalities, with the aim of alleviating poverty in these communities. The study will focus only on three municipalities i.e. Makhado, Mutale, and Thulamela.

3.3.2 Sampling design

The total number of 911 households benefited from the egg laying programme in the Vhembe district. The beneficiaries were from poor households. A sample of 200 project/households was randomly selected from the three targeted municipalities within the Vhembe District.

3.3.3 Data collection

Primary data was collected from beneficiaries of the targeted communities and they were interviewed individually and as a group through their committees. Secondary data was also collected from LDoA documents, reports and other literatures.

A semi-structured interview schedule was used to collect data from the mentioned key informants interviewed individually using the funnelling questions (Burns, 1997). The schedule was in English and translated to the local African language and pre-tested with few respondents, and adjusted and revised where necessary before the actual interview (See Appendix 2).

3.3.4 Statistical Analysis

The Proc Freq procedure of the statistical analysis of variance (SAS, 2003) was used to compute the frequencies and proportions of various classes for each variable of interest. Both simple frequencies and 2-way contingency tables were explored to determine homogenous associations between variables (Agresti, 1996).

3.4 Results

Table 4 shows the age distribution of beneficiaries. From the results, a high proportion (48.5%) of beneficiaries is between the ages of 35 – 50, with a low proportion (7%) of beneficiaries less than 35 years.

Table 4. Age distribution of beneficiaries.

Age group	Frequency	Percentage
< 35	14	7
35 – 50	97	48.5
51 – 65	58	29
> 66	31	15.5
TOTAL	**200**	**100**

Table 5 shows the gender distribution of beneficiaries. The results show a very high proportion (81.5%) of beneficiaries to be women or females and very low proportion (18.5%) is males.

Table 5. Gender of beneficiaries.

Gender	Frequency	Percentage
Male	37	18.5
Female	163	81.5
TOTAL	**200**	**100**

Table 6 shows the proportion of beneficiaries in the initiation of the projects; satisfaction of the beneficiaries with the project and ability of the project to sustain itself. A high proportion (96.48%) of the beneficiaries indicated that the projects were initiated by Government and only a very low proportion (3.52%) indicated that they initiated the projects themselves. A high proportion (88.94%) indicated that they did not decide on the type of the project they were interested on and a very low proportion (11,06%) decided on the type of the project they were interested on. From the study it was also clear that a high proportion (60.71%) of the beneficiaries were not satisfied with the projects because they were interested in other projects unlike the layers and a low proportion (39.29%) were satisfied with their projects. A proportion of 55.27% indicated that the project can sustain itself while 46.73 indicated that the project can not sustain itself.

Table 6. Proportion of beneficiaries in the initiation of the projects, interest and sustainability of the project.

Parameter	Proportion of beneficiaries (%)
Initiation of the project	
Self	3.52
Government	96.48
Decision on the type of the project	
Yes	11.06
No	88.94
Satisfied with the project	
Yes	39.29
No	60.71
Can the project sustain itself	
Yes	53.27
No	46.73

Figure 1 shows the association between the initiation of the project and the satisfaction of the beneficiaries with the project. There was a high unsatisfaction with those project which were initiated by government and a high satisfaction of the beneficiaries whose projects were initiated by the beneficiaries themselves.

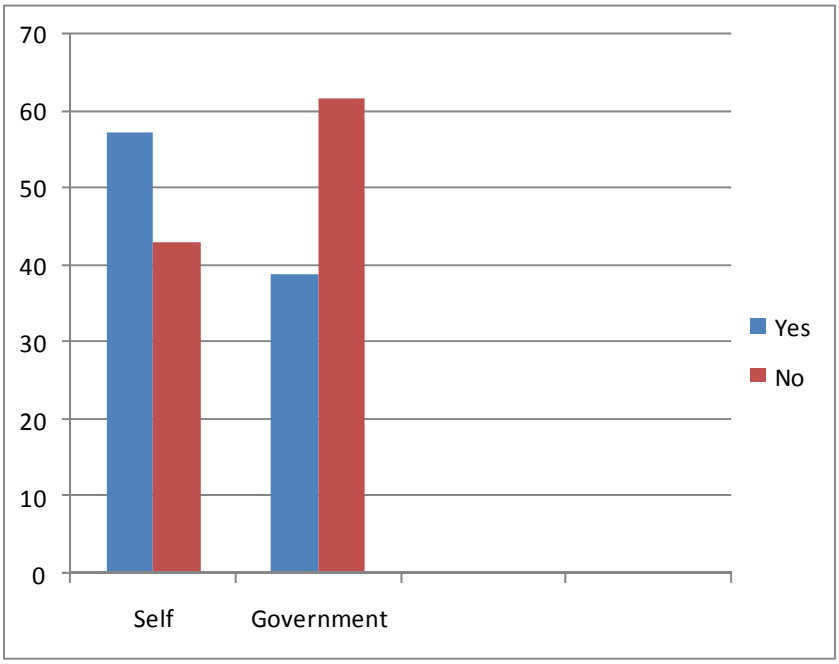

Figure 1. The initiation of the project in relation to beneficiary satisfaction with the project.

Figure 2 shows the association between satisfaction of the beneficiaries and opportunity to decide on the type of the project. Where beneficiaries were given an opportunity to decide on the type of the project, a high proportion were satisfied and where beneficiaries were not given an opportunity to decide, a high proportion indicated that they were not satisfied with the project.

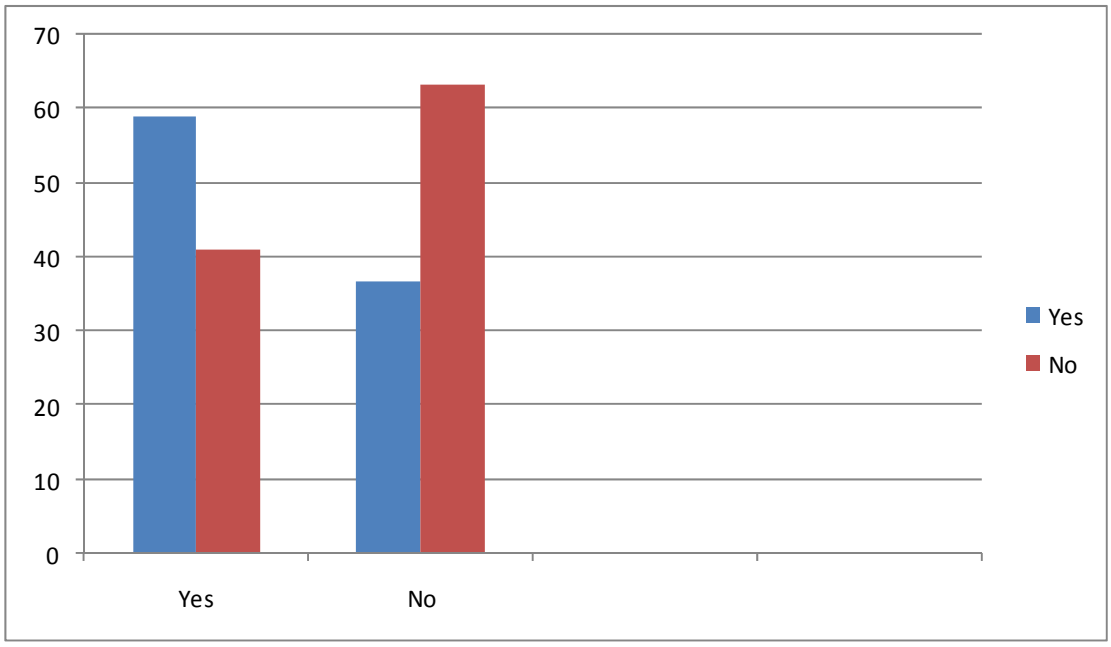

Figure 2. Opportunity to decide on the type of project versus satisfaction about the project.

Table 7 gives a summary of the proportion of beneficiaries according to the number of layers allocated, success of the project, and success indicators. A high proportion (74.37%) of beneficiaries received 36 layers and very low proportion (3.02%) received more than 36 layers. A high proportion (86.36%) of the beneficiaries indicated that their projects were successful, while a low proportion (13.64%) indicated that the projects were not successful. A high proportion (69.39%) of beneficiaries indicated the success indicator of the project as the ability to make more profit.

Table 7. Summary of the proportion of beneficiaries according to the number of layers allocated, success of the project, and success indicators.

Parameter	Proportion of beneficiaries (%)
Number of layers	
< 18	0
18	22.61
36	74.37
36	3.02
Success of the project	
Yes	86.36
No	13.64
Success indicators	
Making more profit	69.39
High market demand	16.84
Low profit	11.73
High mortality	2.04

Figure 3 shows the relation between success indicators and number of layers. There is close relation between the number of layers and the success indicator. The results show that the beneficiaries with 36 and more layers were able to make profit and could even see that been sustainable. The beneficiaries with less that 36 layers were experiencing high market demand problem as they were not producing enough due to the number of layers they were having and this affected their profit. The latter could not see the project been sustainable.

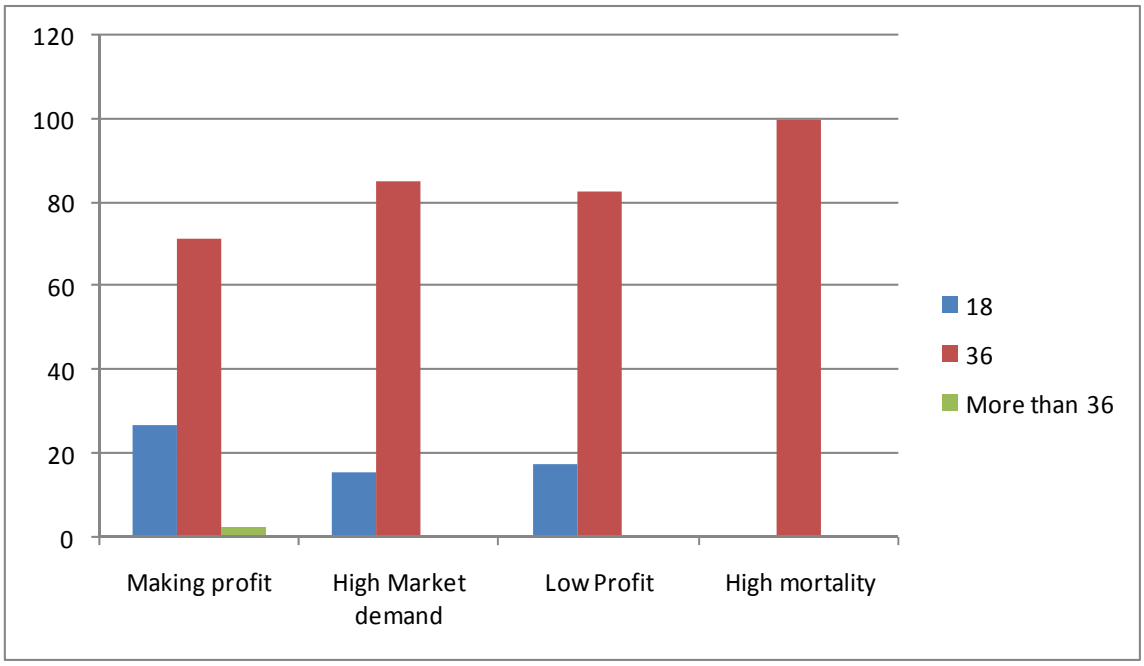

Figure 3. Success indicator of the project versus the number of layers.

Table 8 shows the proportion of extension support, visit by extension officers to projects and knowledge of causes of mortalities by the beneficiaries. A high proportion (100%), indicated that they receive support from the Extension officers. A high proportion (53.77%) indicated that they are visited once a week by the extension officers, 28.14% visited twice a week; 2.51% visited once a month and 15.58% not visited by extension officers. A high proportion (69.35%) of beneficiaries indicated that they don't know the causes of mortalities of their layers. Only 10.55% and 20.10% were able to identify the causes of mortality as diseases and harsh weather.

Table 8. Proportion of extension support, visits and knowledge of causes of mortality**.**

Parameter	Proportion of beneficiaries (%)
Extension support	
Technical support	100
Visits by extension officers	
Once a week	53.77
Twice a week	28.14
Once a month	2.51
None	15.58
Knowledge of causes of mortality	
Diseases	10.55
Harsh weather	20.10
Do not know	69.35

Figure 4 shows the relationship between the number of visits by extension officers to the projects, and beneficiary knowledge of the causes of mortality. The results show a close relation between monthly visits and knowledge of causes of mortalities. It is clear therefore that the lesser the visit, the lesser the knowledge of the beneficiaries to know the causes of mortalities.

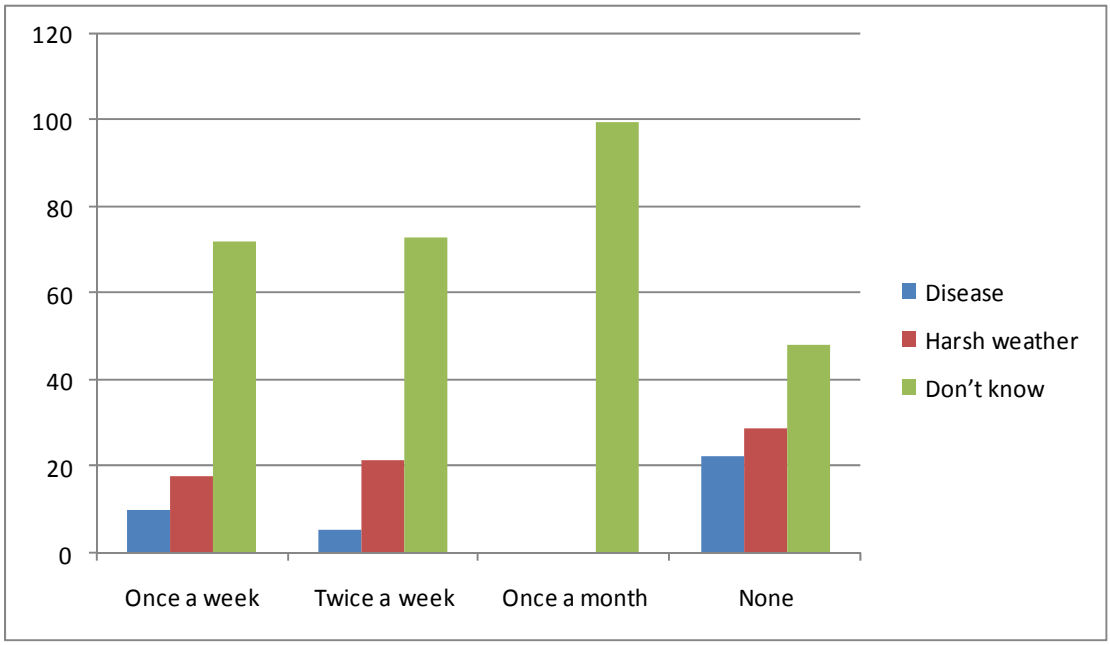

Figure 4. Number of visits as compared to the knowledge of the causes of mortality.

Figure 5 shows a close relation (66.21%) between poor support received from extension officers and lack of knowledge in the causes of mortality.

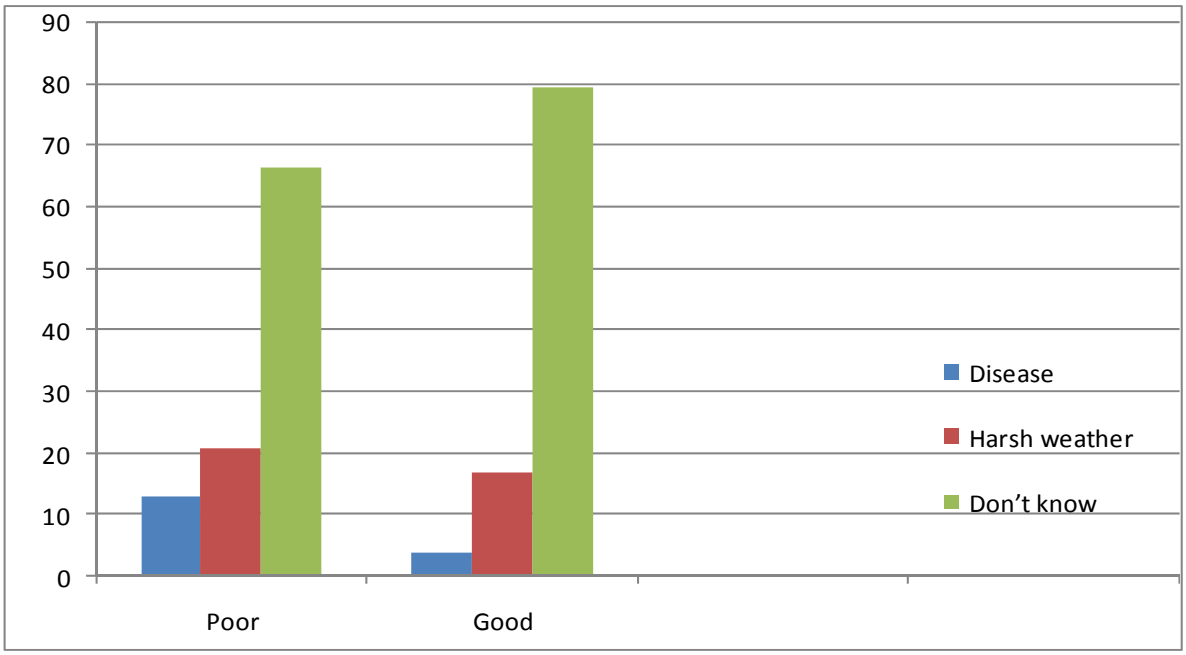

Figure 5. Rating of support in relation to the knowledge of the causes of mortality.

Table 9 shows the proportion of beneficiaries' ability to know the causes of mortality and training to identify and treat diseases. A high proportion (69.35%) of beneficiaries indicated that they don't know the causes of mortality to their layers. This was also supported by a high proportion (65.83%) of beneficiaries who indicated that they were not trained to identify and treat diseases.

Table 9. Ability of beneficiaries to identify and treat diseases in flocks.

Parameter	Proportion of beneficiaries (%)
Causes of mortality	
Diseases	10.55
Harsh conditions	20.10
Do not know	69.35
Training to identify and treat diseases	
Yes	34.12
No	65.83

Figure 6 shows the association between knowledge of causes of mortality and training offered to identify and treat diseases. There is a very close association (65.94%) between lack of knowing the causes of mortality and lack of training to identify and treat diseases. There was also a very close association (67.50%) between harsh weather as the cause of mortality and lack of training offered to identify and treat diseases. The very close association here might be there as the beneficiaries were failing to know the real cause.

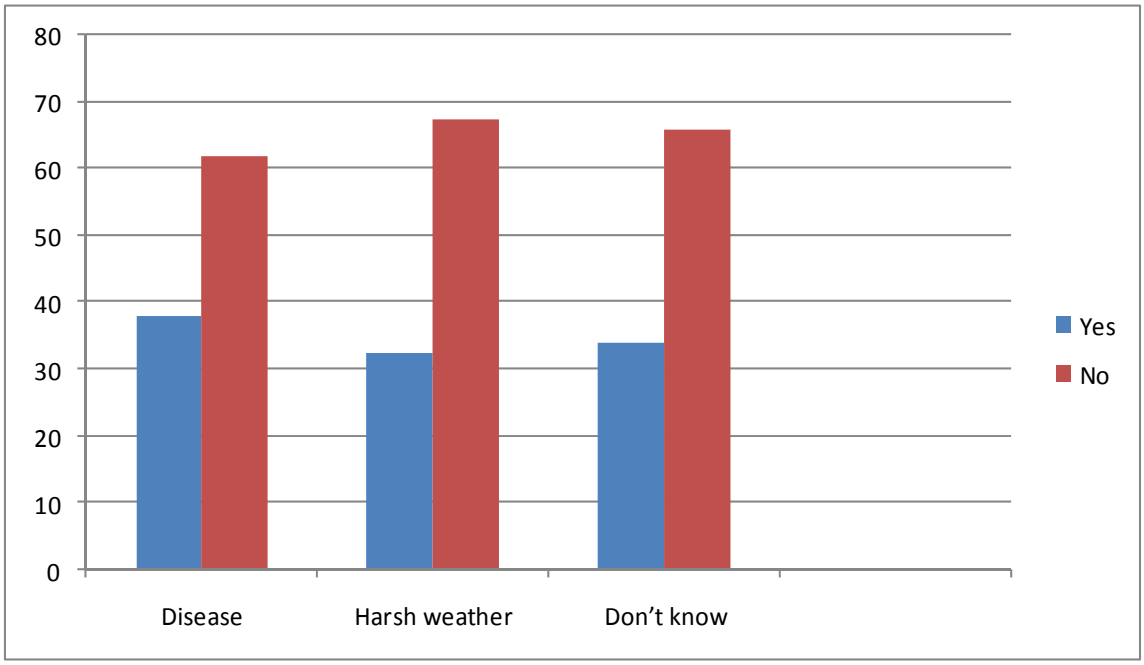

Figure 7. Knowledge of causes of disease in relation to training offered for identification of diseases.

Table 10 and Figure 8 indicate that a very high proportion of beneficiaries (73.87%) rated the performance of the project as good. A high proportion (53.27%) indicated that the project can sustain itself. A high proportion (52.76%) indicated the sustainability of the project as the good market of the products. Though market of the products alone can not be a good indicator of the sustainability of the project as it involves some other factors, like disease control.

Table 10. Proportion of the ranking of the project's performance and its sustainability indicators.

Parameter	Proportion of beneficiaries (%)
Ranking of the project's performance	
Poor	12.06
Average	10.05
Good	73.87
Excellent	4.02
Sustainability of the project	
Yes	53.27
No	46.73
Sustainability indicators	
Satisfactory profit margin	30.65
Good marketing of the products	52.76
Both	16.58

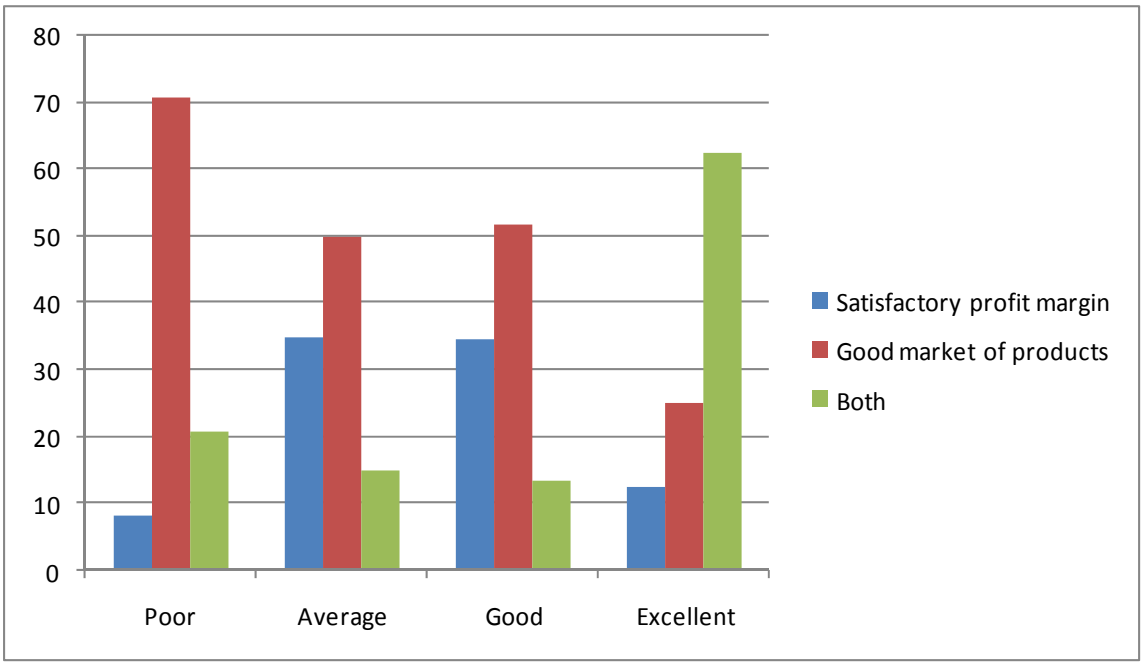

Figure 8. Ranking of the performance of the project in relation to sustainability indicator of the project.

Figure 9 shows a very close association (100%) between the excellent performance of the project and ability to sustain itself. The association was a contribution of very few beneficiaries (8) who might be the once who started the projects on their own. A very high association (95.83%) between the poor performance of the project and inability to sustain itself. A high association (55.10%) between good performance and ability of the project to sustain itself.

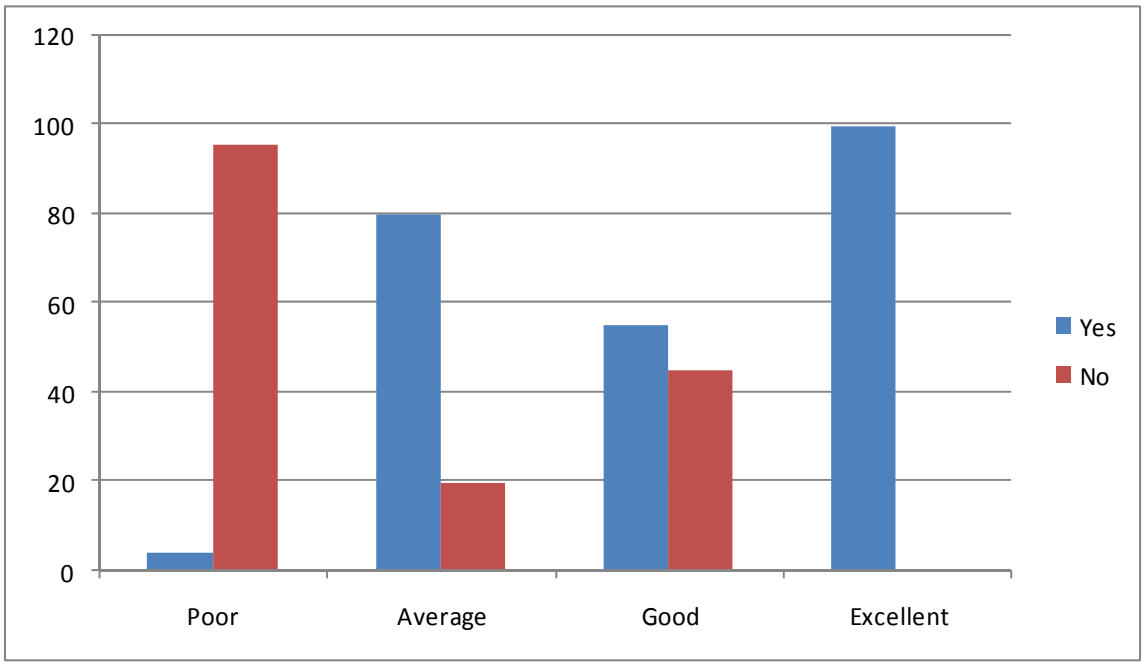

Figure 9. Ranking of performance of the project in relation to the ability to sustain itself.

3.5 Discussion

Experience from around the world has shown that with relatively simple technical measures, smallholders' production of meat and eggs from local or improved poultry breeds can be improved (Gueye, 2003; Riise *et al*., 2005). However, adoption of new technologies is a slow process for most small-scale farmers (Larsen, 2002). The majority of small-scale producers around the world still depend on extension systems when wanting to develop or expand their projects. These extension systems are, in most places, either completely lacking or highly dysfunctional due to budgetary limitations, competency and severe reduction in man power caused by a general reconstruction of many national advisory systems (Hooton *et al*., 2003).

The study confirmed what was reported by Permin *et al*. (2000) that traditional women are caretakers of the poultry in most poor countries. This suggest that in rural areas poultry have more bearing on the lives of women than men. In rural areas chickens are generally regarded as livestock that women raise, mainly because that are perceived to be of lesser commercial value than other kinds of livestock such as cattle and goats. Furthermore, experience shows that the entire family benefits more from an income belonging to a woman than an income belonging to a man (Sen, 1999).

The initiation and the decision on the type of project to initiate have some negative impact on the sustainability of the project. From the study, a high proportion (60.71%) of beneficiaries were not satisfied with the project because they were not given any opportunity to decide the type of project they were interested in as indicated by a high proportion (88.94%), but instead the government who is the initiator imposed the project to the beneficiaries. Small scale commercial poultry enterprises are, nevertheless, often promoted and used by government and non-governmental organizations in development projects to create income generating activities (Mingay, 1998; Trollip, 1998; Welthli, 1999), and to improve food self-sufficiency and alleviate malnutrition, as poultry is an excellent source of protein (MacGregor & Abrams, 1996; Farrel, 2000).

A high proportion (69.35%) of farmers doesn't know the causes of mortality to their layers. The reason to be lack of knowledge about diseases. The fact that layers allocated to beneficiaries were point of lay and were vaccinated when being delivered pose a serious problem as they couldn't have any opportunity to vaccinate them and have a better knowledge of identifying certain diseases. The main target group are poor and often illiterate farmers, thus the need for practice supported by simple drawings. Despite the training courses offered by LDoA through their two colleges; Madzivhandila and Tompi Seleka Colleges of Agriculture, to small scale farmers, the present survey revealed that these course is either insufficient, or too short for the farmers to clearly understand the basics of good management. The level of identification of diseases by the beneficiaries observed during the survey did not reflect any advantage from the training. The findings of the survey revealed that several factors are crucial to the advancement of the poultry industry through small scale operations in Limpopo: farmer training and efficient extension services. Equally important is the regular training of trainees, the extension and advisory staff, in technological developments.

An effective on-farm disease control program depends on spotting a problem early. If beneficiaries are not capable of detecting an early disease process or challenge, then the financial burden of bird mortality and production parameter losses will increase. Not only is the early detection of disease critical for the immediate flock, but also surrounding flocks or successive flocks to follow. As critical to early detection of a disease or problems is a quick and accurate diagnosis. This is hopefully followed with immediate professional support for therapeutic indications and or managerial advice.

A high proportion of beneficiaries (65.83%) who were allocated the layers were not trained to identify diseases before given the layers. According to the study conducted by (Faroog *et al.,* 2000), training given prior the initiation of the project and during production has a positive effect on egg production and sustainability of the project. In the same study total egg production per household was high amongst beneficiaries who received training than before they were given training. The higher egg production could be attributed to the better care and management of the birds. According to Shakir *et al.* (1999) training also reduced morbidity and mortality in chicks and adult birds. This could probably be due to appropriate hygienic measures, better care of the flock and effective vaccination and health coverage programmes after receiving training on chicken production.

The support that beneficiaries received from local extension officers was not adequate. Problem of public agricultural extension officers not being motivated to address poor farmers and problems relating to poultry production and health is not new (Van der Fliert *et al*., 1995). Possible explanations for a general reluctance comprise the lack of professional competences in communication and facilitation of the extension staff, and the incentives structures in the public system not rewarding personal endeavours.

Information on income and expenditure was not easy to obtain, the cost of production was then not easy to calculate, as the majority were not sure of the costs related to their production system. This is a clear indication that accurate record keeping is a major problem that needs to be addressed by extension staff. The profitability and viability of a poultry enterprise is influenced by a number of factors, the most important ones being managerial factors; feed cost and market price. To operate an efficient operation, the producer needs to maintain proper production and financial records. Farmer training needs to play crucial role in poultry production if better returns are to be realized. Better understanding of the importance of critical inputs and of proper record keeping is especially vital.

The beneficiaries don't have any problem with market as they sell their products to local communities. Market availability can not make the project to be sustainable as assumed by a high proportion (68.57%) of beneficiaries. They are other factors like cost of inputs and number of layers one is having also play a role in the sustainability of the project.

3.6 Conclusion

The aim of the study was to evaluate the impact of managerial factors on the sustainability of the egg laying poverty alleviation projects in the Limpopo Province of SA. Although 22% of the beneficiaries in the survey areas were studied, the results can be considered representative of the general condition of the programme.

Factors contributing to sustainability of the egg production are complex, but managerial skills, disease identification and treatment; feed supply and quality; pullet quality appearance; housing; light control, and various management environmental factors are immediate areas for improvement. Beneficiary training needs to play a crucial role in poultry production if better returns are to be realized. Better understanding of the importance of critical inputs and of proper record keeping is especially vital.

Mortality rates among small-scale commercial poultry producers are often distressingly high (Bisschop, 1997). Most disease problems that arise can be related to poor farm management and associated technical problems. Housing is generally inadequate or inappropriate, chickens are frequently underfed, hygiene is poor, bedding inadequate, incorrect brooding temperatures and vaccines and medication, if given at all are often administered incorrectly. These technical constraints can largely be overcome through training, extension and technical follow-up. Important information that needs to be disseminated includes: possible poultry production systems, environmental requirements for poultry development, nutrition and water, appropriate technology and equipment, health and disease, husbandry and management, marketing and product technology, financial management, record keeping and source of information. However, without an appropriate institutional environment efficient poultry production in the rural areas is limited irrespective of training, extension and technical follow-up.

If poultry is to remain an important tool to fight poverty, it is necessary to make sure that (i) the beneficiaries must come from the poorest segments of the village, (ii) the cost of producing an egg must be lower than the commercial sector, (iii) an enabling environment must be established to keep a small flock of hens inter alia, access in the village for feed, vaccine, vaccination services and other inputs and services and (iv) the enabling environment must contain institutional and political space to provide the people involved the possibilities and opportunities to take the next step out of poverty. Policies and institutions must facilitate forms of targeted small-to medium scale credit, based among others on the strengthening of property rights, to ensure the poor's future involvement in increasing production and processing. Clearly, an enabling institutional and political environment is indispensable if interventions and strategies are to focus on the poor in a sustainable way (LID, 1999; IFAD, 2001)

Chapter 4

GENERAL CONCLUSION

Poverty continues to be a problem in South Africa and it is largely concentrated in the agriculture dependent part of the population. In Africa, most people live in rural areas, in some countries up to 80% of the population (Minga *et al.,* 2000). The little development that there is in Africa is skewed in favour of the urban dwellers. The rural areas are characterized by poor roads, and lack of health facilities and piped water and very low income. The main occupation of the rural people is agriculture in its various forms, namely crop production and livestock, including poultry keeping. Village agriculture is the traditional subsistence type and has very limited surplus for sale, and as a result the vicious circle of poverty has been very difficult to break. Thus improving the standard of living of people in the rural areas may help alleviate the problems of urbanization. This can be achieved by accelerated rural development, particularly of the agricultural sector, which is the most important in the livelihoods of rural people in South Africa. As such rural development can be improved through transfer of appropriate technology and improved efficiency of agricultural production, in an attempt to alleviate poverty, as well as stimulating economic growth. Despite the abundance, importance and potential of poultry, developers in Africa have overlooked its use as a tool for alleviating poverty.

For successful project implementation, institutional and organizational support is required at various levels. It is true that the chain is only as strong as its weakest link. For successful implementation of projects, there should be support and involvement of the community at grass roots level through community based organizations to promote sustainability of the projects.

Success stories that have reported in using poultry production as a tool for poverty alleviation have been associated with tremendous support by institutions and organizations that has been long term, for example the Bangladesh Model. Institutional support can start at grass root level all the way to policy makers and can cover all facets of poultry production to make it successful (Kitalyi, 1998). Support can be in terms of motivation and moral support within households and the community at large. At another level, institutional support can also include supply and distribution of inputs (feed, vaccines, other drugs, etc), disease control, training and capacity building including production and dissemination of relevant information and all the way to marketing of products. This kind of support will allow for continuity, building up of farmer confidence and most importantly, sustainability of the projects (Kusina & Kusina, 1999). However, according to Kityali (1998), any approach taken by institutions and organizations to provide support in rural development should aim at breaking the dependency syndrome and allow for active participation by farmers as this promotes sustainable growth of projects. Commodity farmer groups can also be formed to allow farmers to purchase inputs and market products in bulk and thereby reducing transport costs.

The main challenge for egg layer projects therefore is organizational, not technical. It is important to continue to promote egg layer projects to contribute towards household nutrition security and livelihood support but

concerted efforts must be made to find organizational solutions to provide extension support on issues poor husbandry including low plane nutrition and lack of improper shelter, lack of health care including lack of disease prevention and treatment. Government extension programs should be oriented towards addressing the needs of the poor households. In this context, significant investment in capacity building and empowerment of the village communities can act as the harbinger of change and technology adoption and to establish the foundation for a village based farmer to farmer livestock extension mechanism

There is a growing understanding that rural people themselves are knowledgeable on the many subjects that touch their lives and that they possess a creative and analytical capacity (Chambers, 1991) which can greatly assist in the development of improved agricultural practices. Sriskandarajah *et al.* (1989) suggested that knowledge is not a commodity, for transfer from the informed to the uninformed, but the outcome of a dynamic, collaborative process between co-learners. Since the 1980's, small scale poultry producers in Denmark and other industrialized countries, have used an experience exchange system called experience sharing groups (ERFA). Farmers with the same type of production meet on regularly basis to discuss experience, problems and solutions within their specific context (Skejby, 2002).

Experience from around the world has shown that with relatively simple technical measures, smallholders' production of meat and eggs from local or improved poultry breeds can be improved (Gueye, 2003; Riise *et al*., 2005). However, adoption of new technologies is a slow process for most small scale farmers (Larsen, 2002). Locally appropriate approaches for technology transfer need to be developed and tested together with and by farmers themselves (Dilts *et al*., 1995). Unfortunately, even today, the majority of small-scale producers around the world still depend on extension systems when wanting to develop or expand their livestock keeping. These extension systems are, in most places, either completely lacking or highly dysfunctional due to budgetary limitations and severe reductions in man-power caused by a general reconstruction of many advisory systems (Hooton *et al*., 2003). This calls for a participatory approach, whereby farmers may themselves develop necessary "enabling environment" for them to demand the necessary inputs, in particular in terms of veterinary services and training.

Recommendations

To move from a poverty cycle to an income cycle and begin to make a real contribution to overall economic development, smallholders need market access, business support tools, training in collective action and information on prices. This requires research on the distribution systems, how to add value to products by improved quality, reducing contamination, processing and packaging, managing supply chains and developing private sector linkages. There is a need to harness the benefits of the private sectors to support the development of smallholder layers on a strategic alliance of major retailers, traders, government departments and national and international trading organizations in the long term where possible. It is also naive to believe that it can be done without a substantial donor support.

The smallholder poultry concept developed in Bangladesh is one of the tools that have proven to be effective in reducing poverty in rural areas and was found to be sustainable. Most notably, poultry production has proven to be unique entry point for the poorest segment of the village population to reverse the poverty spiral. Thirty six hens don't seem economically viable to sustain an average family of 6 dependents, despite other means of meager income in the household. Doubling the unit to at least 72 hens could without any doubt improve the livelihoods of vulnerable households and make the project sustainable. Before a project is undertaken and implemented, feasibility study should be conducted (i.e. to determine the cost, climatic conditions, geographical interventions, level of skills required for the project, support available and needed, quality and quantity of materials needed) to ensure economical implementation and monitoring.

In the early phase, it is important to have a vision of the end-of-project situation and to see the project in a bird's eye perspective with one eye, while at the same time with the other eye try to apply the perspective of the poor at the grassroots level. By having a holistic approach to poultry development, taking into account technical as well as organizational aspects, it is possible within a relatively short period to develop poultry production systems based on locally available resources which may help the poorer farmers in developing their skills and creating a sustainable income with very few inputs.

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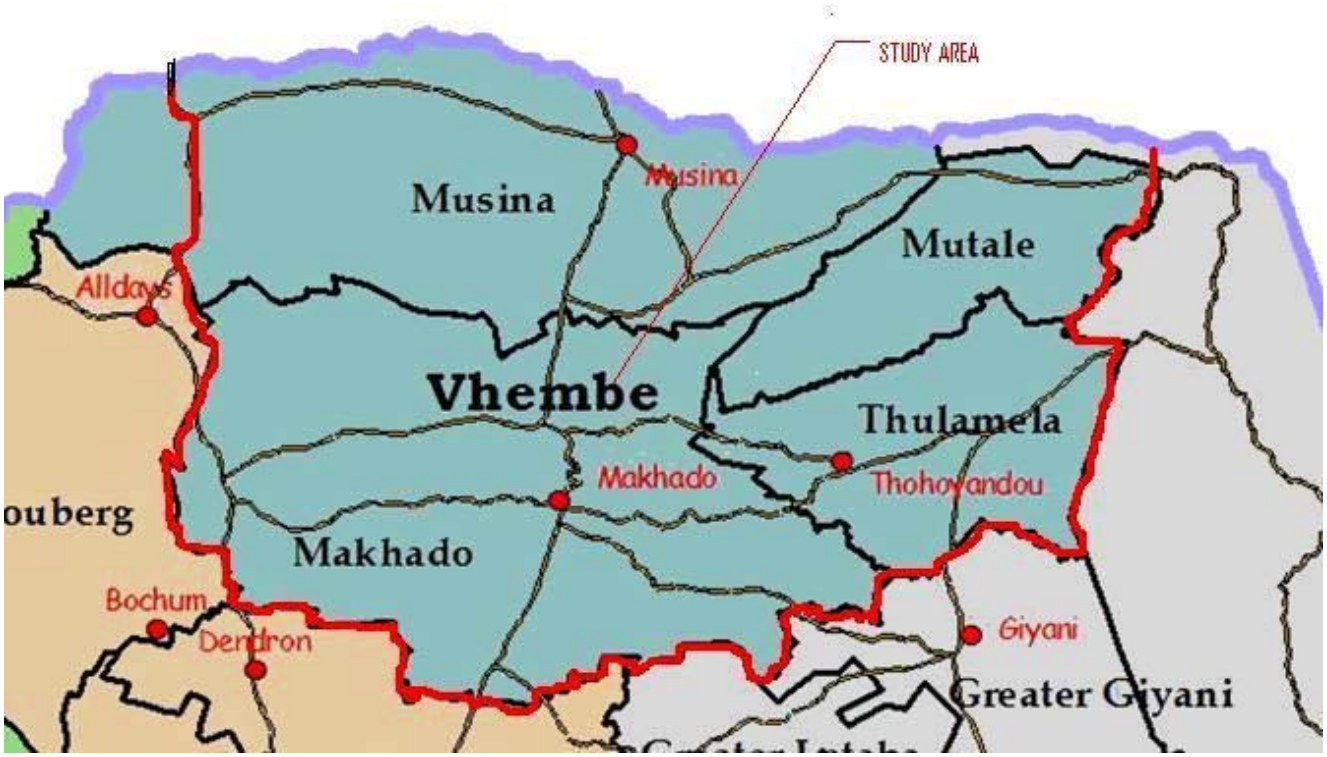

(Source: Municipal Demarcation Board, 2006)

Figure 10. A map of the Vhembe district, indicating the municipalities used in the survey.

QUESTIONNAIRE

TOPIC: Evaluation of the impact of managerial factors on the sustainability of poverty alleviation egg laying Project in the Vhembe District

Date of interview	
Name of village/town	
Name of district	
Name of municipality	
Ward number	
Name of Farmer	

SECTION A: BIOGRAPHIC INFORMATION OF HOUSEHOLD

A.1. How long has the household been living in this area?

Period	Code
Less than 1 year	1
1 – 2 years	2
3 -5 years	3
Over 5 years	4

A.2. How old are you?

Age	Code
Younger than 35	1
35 – 50	2
51 - 65	3
66 and older	4

A.3. Gender of household head

Male	1
Female	2

A.4. Marital status of respondent

Single	1
Married	2
Divorced	3
Widowed	4

A.5. Highest level of education attained by the respondent

No formal education	1
Up to grade 7	2
Grade 8 -12	3
Post Secondary education	4

A.6. Ethnic group of respondent

Venda	1
Shangaan	2
S.Sotho	3
Zulu	4
Afrikaans	5
N.Sotho/Pedi	6
Tswana	7
Other	8

A.7.(a) Please indicate ownership of your dwelling

Own	1
Rent	2

(b) Please indicate your type of dwelling

Formal house	1
Traditional house	2
Shack	3
Single room	4

A.8. How many people are living in the house as of today?

Age group	Score
Less than 18 yrs	1
18 – 35	2
36- 55	3
56 and older	4

A.9. Please indicate the age and gender of members of your household and their level of education.

Age	**No**	**Gender**	**Highest level of education attained**
		Male = 1 Female = 2	
1-10			
11-20			
21-30			
31-40			
41-50			
51-60			
61 and older			

Scoring for level of education

No formal education = 1
Grade 1- 7 = 2
Grade 8 to 12 = 3
Post grade 12 = 4

A.10. Please indicate if any member of your household is involved in farming

Yes	1
No	2

A.11. If involved in agriculture indicate whether

Full time	1
Part-time	2

SECTION B: HOUSEHOLD EMPLOYMENT AND INCOME

B.1. How many people in your household are employed?

Number	**Score**
None	1
1	2
2	3
3	4
4 and above	5

B.2. What type of employment (if employed)

Type	**No of people**
Agricultural employment	
Formal employment	
Unemployed (looking for work)	
Not working	

B.3. Please indicate the source of your household income

Please tick as appropriate	
(a) formal employment income	
(b) remittance from scheme	
(c) Agricultural source (crops and livestock	
(d) Government social security grants (pension etc)	
(e) other sources	

B.4.Please give us an estimate of your annual household income before the project (put zero if no income from that source).

(a) Formal employment income	R
(b) Remittances from a scheme	R
(c)Agricultural source (crops and livestock)	R
(d)Government social security grants	R
(e) Other sources	R

B.5 What was your total household income for the year before the project?

Amount in R	Before	After
Less than R10 000		
R10 000 – R20 000		
Between R20 000 and R50 000		
Over R50 000		

B.6. What was your total household income for the year after the project?

Amount in R	Code
Less than R10 000	1
R10 000 – R20 000	2
Between R20 000 and R50 000	3
Over R50 000	4

B.7. Over the past three years what was the trend in your household income?

Decreasing	1
Increasing	2
Constant	3

B.8. Please give reasons for this change in the household income

Change in salary received	
Change in Agricultural Revenues of prices	
Change in government social security payments	
Others (specify)	

B.9. What type of employment are you engaged in?

Self employed	1
Unemployed	2
Part-time employed	3

B.10. Are you a sole breadwinner?

Yes	No
1	2

B.11. If not, how many of the family members are also income earners?

0-2	1
2-4	2
4-6	3
6-8	4
8-10	5

B.11. What is your average household income?

R1 – R99	1
R100 – R999	2
R1000 – R2000	3
R2001 – R3000	4
R3001 – R4000	5
R4001 – R5000	6
R5001 – R6000	7
Other (Specify)	

SECTION C: PROJECT DETAILS

C.1. When did the project start? YEAR _____

C.2. Who initiated the project?

Self	1
Community	2
Government	3
NGO	4
Other	5

C.3. Where you given opportunity to decide what type of project you want?

YES	NO
1	2

C.4. Which other parties were involved when the project starts?

Traditional leaders	1
Civic association	2
Churches	3
NGO	4
Other Government departments	5

C.5. Are you satisfied with the project?

YES	NO
1	2

C.6. If not what is your problem?

Lack of funds	1
Market	2
Lack of support	3
Lot of political interference	4
High Mortalities	5

C.7. How do you think the problem can be solved?

_____
_____
_____
_____
_____
_____

C.8. Do you recieve any support from local extension officers?

Yes	**No**
1	2

C.9. How many times does the extension officer visit your project?

Every day	1
Once a week	2
Twice a week	3
Once a month	4
None	5

C.10. What support do you get from local extension officer?

_____
_____
_____
_____
_____

C.11. How will you rate the support that you get from the extension officer?

Poor	1
Good	2
Excellent	3

C.12. In your opinion is the project successful?

YES	NO
1	2

C.13. Why do you think the project is successful and why not?

Successful		**Unsuccessful**	
Making more profit		Low profit	
Additional layers		Reduction in the layers	
No Mortality		High mortalityy	
High market demand		Low market demand	

C.14. If in your view it is successful, what are the indicators?

Able to make profit	1
Growth of the project	2
No mortalities	3

C.15. If not, what are the problems

Running to a loss	1
High mortality	2
Lack of support	3
Lack of knowledge	4
Lack of market	5

C.16. Which other project do you think can supplement your egg layer project?

Broiler production	
Vegetable garden	
Bakery	
Piggery	

C.17. Were you interested in starting with an egg laying project to improve household income?

YES	NO
1	2

SECTION D: PRODUCTION

D.1. How many chickens did you receive?

Less than 18	
18	
36	
More than 36	

D.2. How many do you have at present? _____

D.3. Where are they staying?

Cages	
Chicken house	
Free range/no house	

D.4. How many have died so far?

0 – 5	
6 – 10	
11 – 18	
More than 18	

D.5. What was the cause(s) of mortality?

Diseases	
Predators	
Harsh weather	
Don't know	
Lack of feeds	

D.6. Are they all producing eggs?

Yes	No
1	2

D.7. If not what could be the problem?

Diseases	
Old stock	
Improper feeding	
Genetical/breed	
Not sure	

D.8. If it is an illness, did you know what disease was it?

Yes	No
1	2

D.9. Do you use medicine?

Yes	No
1	2

D.10. Were you trained to identify and treat diseases?

Yes	No
1	2

D.11. What type of feed do you use?

Commercial feeds	1
Home mixed feeds	2
Other (specify)	3

D.12. Where do you get your feeds?

Feed mill	
Local co-op	
Local supermarkets	
Government	

D.13. What other problems are you experiencing with your layers?

High mortality	
Low production	
High input cost	
Eating of eggs	

D.14. Are you planning to have more layers in future?

Yes	No
1	2

D.15 If not, why?

Not a profitable project	
Not interested in keeping layers	
Insufficient support	
Insufficient space	
Other	

D. 16 Do you get any support from the local Agricultural office

Yes	No
1	2

D. 17 If yes what type of support

Support	**Score**
Technical support	1
Financial support	2
Market access support	3
Administration support	4
Other	5

D. 18 Do you attend agricultural related meetings

Yes	No
1	2

D. 19 If not, Why?

Reason	**Score**
Not aware	1
Don't see the value of attending the meeting	2
Other commitments	3
We don't hold meetings	4
Other	5

SECTION E: MARKET

E.1. Where do you market your eggs?

Local community	
Hospital	
Nearest town	
Transport to big cities	
Other (Specify)	

E.2. Do you have a good market for your products?

Yes	No
1	2

E.3. Did you receive any support in accessing markets?

Yes	No
1	2

E.4. If Yes, what type of support were you given?

E.5. How will you rank the performance of the project?

Poor	1
Average	2
Good	3
Excellent	4

E.6. Which in your view is the sustainability indicator of the projects?

Good business plan	
Good project management	
Support by local community	
Satisfactory profit margin	
Good marketing of products	
Other (specify)	

E.7. Which are the seasons with good sale?

January – March	1
April – June	2
July – September	3
October - December	4

E.8. Please indicate your monthly expenditure.

Cost item	Amount (R)
Electricity and Water	
Transport cost	
Input of feeds	
Other (specify)	

E.9. Do you think the project can sustain itself ?

Yes	No
1	2

E.10. If not what are the problems?

Problem	Score
Insufficient funds	1
Poor support by the Government	2
Lot of political interference	3
Lack of market for the products	4
None of the above	5

E.11. What type of project improvement are you having in mind for future?

_____
_____

E.12. What recommendation can you give to the Department of Agriculture with regard to egg laying projects?

_____
_____
_____
_____
_____
_____
_____
_____
_____

E.13. Any other problem you are experiencing in the project?

_____
_____
_____
_____
_____